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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|---|---|---|---|---|
| 10/800,625 | 03/16/2004 | Zhaoyang Hu | 250576US2X | 9694 |

22850 7590 11/20/2006

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| EXAMINER | |
|---|---|
| STULTZ, JESSICA T | |

| ART UNIT | PAPER NUMBER |
|---|---|
| 2873 | |

DATE MAILED: 11/20/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

| Office Action Summary | Application No. | Applicant(s) | |
|---|---|---|---|
| | 10/800,625 | HU ET AL. | |
| | Examiner | Art Unit | |
| | Jessica T. Stultz | 2873 | |

*-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --*

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

1)☒ Responsive to communication(s) filed on *25 September 2006 and 24 October 2006*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

4)☒ Claim(s) *2-31* is/are pending in the application.

4a) Of the above claim(s) *2-23* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *24-31* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

**Application Papers**

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *06 February 2006* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

## DETAILED ACTION

### *Claim Rejections - 35 USC § 102*

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 24 and 31 are rejected under 35 U.S.C. 102(e) as being anticipated by Lam et al US 2003/0147574, herein referred to as Lam et al '754.

Regarding claim 24, Lam et al '754 discloses a traveling-wave electroabsorption modulator (Sections 30-32, wherein the traveling-wave electroabsorption modulator is shown in Figures 1a-b) comprising: a semiconductor optical waveguide for an optical signal and traveling-wave electrodes for an electrical signal (Sections 6 and 30-32, wherein the optical waveguide is "10" which comprises electrodes for an electrical signal, Figures 1a-b), wherein an electric field applied to the electrode varies an absorption edge wavelength of the optical waveguide (Sections 30-32, wherein the electric field causes the band edge of the multiple quantum wells to shift to longer wavelengths); a first electrical port configured to receive a first electrical signal (Sections 30-32, wherein the first electrical port is "14", Figures 1a-b); a first optical port configured to receive a first optical signal (Sections 30-32, wherein the first optical port is "16", Figures 1a-b); a second electrical port configured to output a second electrical signal extracted by absorbing the first optical signal (Sections 30-32, wherein the electrical signal "14" absorbs light and exits the system at the end of the transmission line "15", Figures 1a-b); and a second optical port

configured to output a second optical signal obtained by modulating the first optical signal (Sections 30-32, wherein the second optical port is "17", Figures 1a-b).

Regarding claim 31, Lam et al '754 further discloses that the first optical signal has a line rate on the order of 40-160 Gb/s (Sections 6 and 36, wherein the first optical signal has a line rate of 50 Gb/s).

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 25 and 28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lam et al '754, as applied to independent claim 24 above, in view of Walker US 2003/0190107 herein referred to as Walker '107.

Regarding claims 25 and 28, Lam et al '754 discloses a traveling-wave electroabsorption modulator as shown above, wherein the second electrical signal has a fundamental frequency that is the same as that of the first optical signal, and wherein the second optical signal has a frequency that is the same as the fist electrical signal (Sections 6 and 36, wherein the frequency of the signals are matched within the system as claimed), but does not specifically disclose that one of the first and second optical ports receives a third optical signal, and the other optical port, respectively outputs a fourth optical signal obtained by modulating the third optical signal based on the first electrical signal. Walker '107 teaches of a traveling-wave modulator (Sections 24-32, wherein the modulator is a traveling-wave modulator, Figures 1-8), wherein two optical signals

are input and then output through the system, and the optical signals are modulated by an electrical signal (Sections 24-32 and 58-60, wherein two optical signals are input into the system, modulated by an electrode "42", and output as shown in Figures 1-8) for the purpose of providing a predetermined frequency chirp in the modulated optical output signals (Sections 24-32). Therefore it would have been obvious to one having ordinary skill in the art at the time the invention was made for the traveling-wave electroabsorption modulator of Lam et al '754 to further comprise one of the first and second optical ports receiving a third optical signal, and the other optical port, respectively outputting a fourth optical signal obtained by modulating the third optical signal based on the first electrical signal since Walker '107 teaches of a traveling-wave modulator wherein two optical signals are input and then output through the system, and the optical signals are modulated by an electrical signal for the purpose of providing a predetermined frequency chirp in the modulated optical output signals.

Claims 26-27 and 29-30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lam et al '754, as applied to independent claim 24 above, in view of Davies et al US 5,999,287, herein referred to as Davies et al '287.

Regarding claims 26-27, Lam et al '754 discloses a traveling-wave electroabsorption modulator as shown above, wherein the first electrical signal has a fundamental frequency (Sections 6 and 36, wherein the frequency of the signals are matched within the system as claimed), but does not specifically disclose that the first electrical signal is obtained by electrically processing the second electrical signal. Davies et al '287 teaches of a traveling-wave modulator (Column 7, line 64-Column 8, line 58 and Column 3, lines 20-24, wherein the optically controlled gate, i.e. modulator, "18" is a traveling-wave semiconductor amplifier,

Figures 2-6) including a first electrical signal which is an electrical clock having a fundamental frequency which is regenerated from a second output electrical signal (Column 4, line 49-Column 8, line 58 and Column 3, lines 20-24, wherein the PLL "16" or "616" provides a recovered electrical clock signal to the fourth port "24" of the modulator "18", which is recovered from a photocurrent from second port "25", Figures 2-6) for the purpose of generating a recovered electrical input to feed back to the modulator using an optically controlled gate (Column 7, line 64-Column 8, line 58). Therefore it would have been obvious to one having ordinary skill in the art at the time the invention was made for the traveling-wave electroabsorption modulator of Lam et al '754 to further include the first electrical signal obtained by electrically processing the second electrical signal since Davies et al '287 teaches of a traveling-wave modulator including a first electrical signal which is an electrical clock having a fundamental frequency which is regenerated from a second output electrical signal for the purpose of generating a recovered electrical input to feed back to the modulator using an optically controlled gate.

Regarding claims 29-30, Lam et al '754 discloses a traveling-wave electroabsorption modulator as shown above, wherein the second electrical signal is induced by electroabsorption of the first optical signal (Sections 30-32, wherein the electrical signal "14" absorbs light and exits the system at the end of the transmission line "15", Figures 1a-b), but does not specifically disclose that the second electrical signal is a photocurrent or that the first electrical signal is a clock signal having a fundamental frequency which is regenerated from the photocurrent. Davies et al '287 teaches of a traveling-wave modulator (Column 7, line 64-Column 8, line 58 and Column 3, lines 20-24, wherein the optically controlled gate, i.e. modulator, "18" is a traveling-

wave semiconductor amplifier, Figures 2-6) wherein the traveling-wave modulator produces a photocurrent as the output electrical signal (Column 4, line 49-Column 8, line 58, wherein a photocurrent from second port "25" is used to detect data and is input back to the system, wherein the photocurrent is determined by the optical signal "23", Figures 2-6), wherein the first electrical signal is an electrical clock having a fundamental frequency which is regenerated from the photocurrent (Column 7, line 64-Column 8, line 58 and Column 3, lines 20-24, wherein the PLL "16" or "616" provides a recovered electrical clock signal to the fourth port "24" of the modulator "18", Figures 2-6) for the purpose of generating a recovered electrical input to feed back to the modulator using an optically controlled gate (Column 7, line 64-Column 8, line 58). Therefore it would have been obvious to one having ordinary skill in the art at the time the invention was made for the traveling-wave electroabsorption modulator of Lam et al '754 to further include the second electrical signal being a photocurrent and the first electrical signal being a clock signal having a fundamental frequency which is regenerated from the photocurrent since Davies et al '287 teaches of a traveling-wave modulator wherein the traveling-wave modulator produces a photocurrent as the output electrical signal, wherein the first electrical signal is an electrical clock having a fundamental frequency which is regenerated from the photocurrent for the purpose of generating a recovered electrical input to feed back to the modulator using an optically controlled gate.

***Response to Arguments***

Applicant's arguments with respect to claims 24-31 have been considered but are moot in view of the new ground(s) of rejection in view of Lam et al '574 as shown above.

For applicant's information, the arguments, amendments, and affidavit filed Septermber 25, 2006, with respect to the 112 rejection of claims 24-31, with respect to the limitations of "a semiconductor optical waveguide", "traveling-wave electrodes", and "one or more sub-harmonic frequencies of the second electrical signal", have been fully considered and are persuasive. The 112 rejections of claims 24-31 have been withdrawn.

***Conclusion***

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Gopalakrishnan et al US 5,422,966 and Geary et al US 6,990,256 are cited as having some similar structure to the claimed invention since they disclose traveling-wave electroabsorption modulators including electrodes that produce an electric field.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jessica T. Stultz whose telephone number is (571) 272-2339. The examiner can normally be reached on M-F 8-4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ricky Mack can be reached on 571-272-2333. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Jessica T Stultz
Examiner
Art Unit 2873
November 10, 2006